

WHAT IS CLAIMED IS:

1. A reading method to a flash memory from a data-access requesting component, wherein the flash memory includes a plurality of storage sectors, and a read operation to one sector of the storage sectors needs a plurality of stages handled by an access control-

5 ler, the reading method comprising:

performing a first read operation to read a current sector of the storage sectors; and

starting to perform a second read operation to a next sector of the storage sectors when the first read operation is not completed yet;

wherein the second read operation starts before the first read operation ends  
10 thereby decreasing the time required to perform read operations and increasing overall system performance.

2. The reading method of claim 1, further comprising

starting to perform a third read operation to read a further next sector of the storage sectors when the first read operation and the second read operation are not completed  
15 yet.

3. The reading method of claim 1, wherein the stages includes a first stage for finding a sector of the storage sectors to be read, a second stage for transmitting an information to be read from the flash memory into the access controller, and a third stage for transmitting an information to be read in the access controller into the data-access re-  
20 questing component.

4. The reading method of claim 1, further comprising recurrently performing the foregoing steps if another sector is still to be read.

5. The reading method of claim 3, wherein the second stage for the first read operation is overlapping with the first stage for the second read operation.

6. The reading method of claim 3, wherein the third stage for the first read operation is overlapping with the second stage for the second read operation.

5        7. The reading method of claim 3, further comprising  
starting to perform a first stage of a third read operation to find out a further next sector of the storage sectors to be read when the first read operation and the second read operation are not completed yet.

8. The reading method of claim 7, wherein the third stage of the first read operation, the second stage for the second read operation, and the first stage for the third read operation are overlapping.

9. A writing method to a flash memory from a data-access requesting component, wherein the flash memory includes a plurality of storage sectors, and a writing operation to one sector of the storage sectors needs a plurality of stages handled by an access controller, the writing method comprising:

performing a first writing operation to write a current sector of the storage sectors;  
and

starting to perform a second writing operation to a next sector of the storage sectors when the first writing operation is not completed yet;

20        wherein the second writing operation starts before the first writing operation ends thereby decreasing the time required to perform writing operations and increasing the overall system performance.

10. The writing method of claim 9, further comprising

starting to perform a third writing operation to write a further next sector of the storage sectors when the second writing operation is not completed yet.

11. The writing method of claim 9, wherein the stages includes a first stage for transmitting an information to be written into the access controller, a second stage for  
5 finding a sector of the storage sectors in the flash memory to be written, and a third stage for transmitting an information in the access controller into the flash memory.

12. The writing method of claim 9, further comprising recurrently performing the foregoing steps if another sector is still to be written.

13. The writing method of claim 11, wherein the third stage for the first writing  
10 operation is overlapping with the first stage of the second writing operation.

14. The writing method of claim 11, wherein the first stage and the second stage for the same writing operation are overlapping.

15. The writing method of claim 11, wherein the third stage of the first writing operation, the first stage for the second writing operation, and the second stage for the  
15 second writing operation are overlapping.

16. A management method for a window-based flash memory storage system having a flash memory unit partitioned into a number of windows, each of at least one of the windows respectively having a mapping information set as a mapping formation stored in the flash memory unit, and an access controller communicating with a data-  
20 access request component and managing the flash memory unit, the management method comprising:

selecting at least a portion of the windows as a selected window set;

loading a corresponding portion of the mapping information with respect to the selected window set into a memory area within the access controller; and

updating the corresponding portion of the mapping information with respect to at least one window of the selected window set when another window that is to be accessed  
5 by the data-access requesting component but is not in the current selected window set.

17. The management method of claim 16, wherein the step of loading the corresponding portion of the mapping information with respect to the selected window set into the memory area within the access controller comprises:

transmitting the corresponding portion of the mapping information stored in the  
10 flash memory unit into the memory area within the access controller.

18. The management method of claim 16, wherein the step of loading the corresponding portion of the mapping information with respect to the selected window set into the memory area within the access controller comprises:

finding a last usable mapping information set of the mapping information stored  
15 in the flash memory unit; and

re-building the mapping information in the memory area within the access controller by scanning all associated blocks record in the last usable mapping information set.

19. The management method of claim 16, wherein the step of loading the corresponding portion of the mapping information with respect to the selected window set into  
20 the memory area within the access controller comprises:

re-building the mapping information in the memory area within the access controller by scanning all probable blocks.

20. The management method of claim 16, wherein the step of updating the corresponding portion of the mapping information comprises:

moving a specific window information set of the mapping information in the memory area within the access controller back to the flash memory unit; and

5 loading another window information set to the memory area of the access controller as an updated part of the corresponding portion of the mapping information.

21. The management method of claim 16, further comprising loading a variable portion of the mapping information set with respect to one window of the selected window set into an active window variable area of the access controller.

10 22. The management method of claim 21, further comprising:

moving the variable portion from the active window variable area to a reserved window variable area;